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EXAMINER	
MERED, HABTE	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/891,378	XIN ET AL.
	Examiner	Art Unit
	Habte Mered	2662

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *01/13/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 1, 24, 36, 44, and 48 are objected to because of the following informalities:

It is not clear how many networks are involved in these claims. Since the word network was used at least three times in different context, the networks in these claims should be clearly labeled and identified.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 1-6, 10, 13-15, 17, and 21-23** are rejected under 35 U.S.C. 102(e) as being anticipated by Golden et al. (U. S. 6, 563, 793), hereinafter referred to as Golden.

4 Regarding **claim 1**, Golden discloses a method of managing the transport of data traffic over a network as shown in Figures 3 and 4. See Column 1, Lines 15-20. Figure 4 shows network 20 and contains a host, a switch, a router, and an Enterprise Control Point (ECP). See Column 7, Lines 44-46. The details of the ECP are shown in Figure 5. ECP can be standalone or can be incorporated in a switch. See Column 7, Lines

63-67. Golden further teaches that the switch and the router are interchangeable entities and can have similar functions and components. See Column 8, Lines 64-67 and Column 9, Line 1. Therefore, the ECP can be considered to be part of the router.

Golden teaches that the router's ECP functionalities store available bandwidth capacity of paths in the network elements registry (Block 57 in Figure 5). See Column 8, Lines 26-29. Golden teaches that a router can receive a request from a host when it desires to reserve a connection with a host in another network. See Column 9, Lines 48-50. The router's ECP controller function will look up the list of available paths between a host and router in the path list (Fig. 5 block 59). See Column 9, Lines 60-65. If an available path can provide the requested service for the connection between the host and the router then a bandwidth reservation is sent and the path is setup. See Column 10, Lines 27-45.

Golden shows in Figure 11 a private network (Block 26). The NCSS (block 30 of Figure 11) is part of the private network as its sole purpose is to process connection request by other networks and consequently inter-connect the network elements in the private network to create a path for data flow. See Column 16, Lines 30-36. Golden further illustrates in Figure 13 that the NCSS contains a router and router controllers. The router in the NCSS is the one that first receives the request from LAN A to connect to LAN C using the facilities of the private network (Figure 11, block 26). See Column 16, Lines 45-52. The route controller of the router in the private network NCSS' examines the paths stored and assigns the path between LAN A (i.e. source) to LAN B (i.e. destination). See Column 17, Lines 26-30 and Column 18, Lines 10-20.

5. Regarding **claim 2**, Golden discloses that a service request for path connection between two entities existing in the same network or in different networks contains the desired bandwidth in packets per second. See Column 10, Lines 30-35. Golden also shows how the system proceeds when the assigned path meets the requested bandwidth. See Column 18, Lines 10-18.

6. Regarding **claim 3**, Golden teaches that the core Network 26 in Figure 11 can be made out of controllable network elements such as ADMs, SONET, and Optical Switches making it a fiber optic network. A pure fiber optic core network guarantees each path in the network to be a lightpath. See Column 16, Lines 25-30.

7. Regarding **claim 4**, Golden teaches that the core Network 26 in Figure 11 can be made out of controllable network elements such as IP switches and routers and IP/ATM concentrators making it an Internet Protocol (IP) core network. See Column 16, Lines 25-30.

8. Regarding **claim 5**, Golden discloses the ECP, which is an entity that can be found in a router, stores available bandwidth capacity of paths in the network elements registry shown in Figure 5 as database 57. See Column 8, Lines 26-29. Also the available bandwidth capacity of the private network is stored in a disk array at the router in the NCSS. See Column 17, Lines 15-20.

9. Regarding **claim 6**, Golden teaches that the router's ECP stores available bandwidth capacity of paths in the network elements registry as a table and the ECP looks up in the stored lookup table where requested service level maps to a bandwidth. See Column 12, Lines 60-62.

10. Regarding **claim 10**, Golden discloses that hosts and routers have signaling capabilities and use an application layer reservation protocol for communication. See Column 7, lines 47-50. Golden further shows that in Figure 11, in the communication between an entity in LAN A as the source and an entity in LAN B as the destination, the entities can be a router or a host in both networks.

11. Regarding **claims 13, 17, 22, and 23**, Golden teaches in Figure 11 a communication path setup between LAN A and LAN C over Private Network 26. The first router can be router 54 in LAN A or the router in the Private Network's NCSS. The second router can be any of the routers in the Private Network 26. The destination node is LAN B and has router 54 and host 52. The route controller picks, one of the assigned paths that involve LAN A and LAN C through Network 26. Therefore the assigned signal path comprises a path from router 52 to a second router in Network 26 that lies on the selected path that goes all the way to LAN B (i.e. the destination node). See Column 18, Lines 10-20.

12. Regarding **claim 14**, by definition, which is simply based on its location, router 54 of Figure 11 (i.e. first router) can be considered border router in LAN A (i.e. 1st network) with respect to Network 26. The router in Network 26's NSCC is also a border router with respect to LAN A and LAN C. The router picked by the route controller in Network 26's NSCC (i.e. 2nd Network) has to be also a border router in Network 26 because the selected assigned path is really a list of next neighbors. See Column 18, Line 28.

13. Regarding **claim 15**, Golden discloses that the selection of the second router in Network 26 (i.e. 2nd network) is close to the first router in distance because the route

controller selected path is a list of next neighbors network elements. See Column 18, Lines 27-30.

14. Regarding **claim 21**, Golden shows in Figure 11, the destination node host 52 resides in LAN C. LAN C is the third network in the communication between LAN A's host 52 and LAN C's host 52 over Network 26. See Column 18, Lines 10-20.

15. **Claims 24-26, 28-34,36-41, 43, and 62-64**, are rejected under 35 U.S.C. 102(e) as being anticipated by Abe et al. (U. S. 6, 512, 745), hereinafter referred to as Abe.

16. Regarding **claims 24 and 36,** Abe discloses that a packet switching network with network management equipment connecting all of the edge nodes (i.e. nodes with router functionalities) and the edge nodes forming the boundary of the connection-oriented core network connected to a plurality of connectionless access networks as shown in Figures 1 and 2. See Column 3, lines 32-37. Abe indicates that the network management equipment distributes available bandwidth capacity of paths in the network to the nodes (i.e. routers). See Column 5, Lines 61-67 and Column 6, Lines 1-6. The network will leak the available bandwidth capacity of paths to edge node router, EA, in the core network 100. EA can be considered as a first router in the core network 100. Abe discloses border router, RA, of access network #A, sends a request to the first router (i.e. EA) to setup a signaled path through the core network to access network #C which is the destination. The first router (i.e. EA) after examining available paths, assigns a signaled path, R2, from EA to EC and then to RC in access network #C. See Column 8, Lines 16-25. The first router (i.e. EA) assigned the signal path to the

destination node using the intermediate nodes N1 and N3. If R6 was the assigned signal path then N2 will be the only intermediate node. See Figure 3.

17. Regarding **claims 25, 26, 30, 32and 39,** Abe discloses the signaled path from the first router to the destination node assigned by the first router (i.e. EA) is an existing path, PVR-R2, and starts at the first router and goes through the Network. See Figure 3, item 2 of the table with PVR-ID of R2. The connection between edge node routers EA and EC with border routers RA and RC respectively is already assigned and established. See Column 5, Lines 1-5 and Column 8, Lines 5-10.

18. Regarding **claim 28,** the available bandwidth capacity of paths leaked by the network to the edge node routers is shown in Figure 3. See Column 5, Lines 35-37. It shows the connection between points, route, and assigned bandwidth for each Permanent Virtual Route (PVR). Each edge node can easily determine which edge node routers it can reach, the relative distance between the edge nodes and the relay nodes, and consequently can determine the list of routers that are close in distance to the first edge node router. See Column 6, Lines 28-45

19. Regarding **claims 29 and 38**, since the core network 100, in Figure 1 and 2, is an ATM network and ATM network can be considered a fiber optic network since it uses fiber to transport data to attain broadband speed. See Column 5, lines 8-9.

20. Regarding **claims 31, 33 and 40**, Abe discloses that in Figure 1 routers, RA and RC, are border routers for networks access #A and access #C respectively. Edge node routers, EA and EC, by definition are also border routers for core network 100. See Column 5, Lines 1-7.

21. Regarding **claims 34 and 41**, Abe discloses a Permanent Virtual Route (PVR), R6, in Figure 3 with respect to the connection in Figures 1 and 2 between network #A and network #C over the core network 100. The path, R6, has the second router (i.e. N1) close to the first router (i.e. EA) and the destination node (EC or RC). See Column 8, Lines 16-25. The first router (i.e. EA) can choose a second router that is close by when using link-state routing. In all types of link-state routing, initially all the routers establish adjacencies with each other and share information regarding their connections using Link State Advertisements.

22. Regarding **claim 37,** Abe discloses an assigned signal path from the first node (EA) to an intermediate node (N2) through the network to the destination node (EC or RC). See Figure 3 with PVR-ID of R6.

23. Regarding **claim 43**, Abe discloses that the core network is an ATM. See Column 5, Lines 8-10. The border router RA, acting as independent user seeking path information from the core optical ATM network has to use a User Network Interface signaling, as it is the standard communication protocol between an end user and an ATM network.

24. Regarding **claims 62-64,** Abe discloses a system in Figure 2, where access network #a is a first network with border router, RA, as the source node. Core network 100 is a second network with a plurality of paths. Access network #c is the third network having a destination node (i.e. border router, RC). Edge node router, EA, is connected to the first and second network. Abe further discloses in establishing a connection between access networks #a and #c through the 2nd core network, the edge node router

receives a request from the source node (i.e. RA) for a path through the second network to route traffic from the first network to the destination node at the third network (i.e. access network #c). Edge router, EA, routes the traffic using an existing path (i.e. R2) to the destination node through the second network. See Column 8, Lines 16-35

25. **Claims 48-53, 56, and 57**, are rejected under 35 U.S.C. 102(e) as being anticipated by Peles et al. (U. S. Pub. No.2002/0163884), hereinafter referred to as Peles.

26. Regarding **claim 48**, Peles discloses a method of controlling traffic on links between autonomous systems. Peles shows in Figure 2 network AS100 with border router 100 equipped with a congestion control system CC 200. Border router 100 monitors the traffic starting from AS100 (i.e. 2nd network) that goes through AS300 (i.e 1st network) to AS500 being the destination network (i.e. remote network). Peles discloses that the congestion control 200 configures border router 100 to assign traffic between AS100 (i.e. 2nd network) and AS500 (i.e. remote network) in such a way that it passes through AS300 (i.e. 1st network). See Paragraph 47. All border routers have the ability of being a mobile agent as it is an element supported by BGP protocol. A BGP local preference is a value configured on BGP border routers. Since there are typically multiple border routers in a single autonomous system, the BGP local preference indicates which border router is preferred for communication with a client with a particular prefix. Therefore, if one of the area border routers fail the remaining border routers can take over as the system disclosed by Peles supports load balancing. See Paragraphs 43 and 44.

27. Regarding **claims 49, 54, and 55**, Peles discloses the first network in this case AS300 is an autonomous system. Being an autonomous system the core network can be ATM, optical, IP or frame-relay. See Paragraph 9.

28. Regarding **claim 50**, Peles discloses in Figures 1 and 2 all of the routers shown are border routers. See Paragraph 10.

29. Regarding **claim 51**, Peles discloses in Figure 3 the congestion control configures border router 100 in AS100 (i.e. 2nd network) to monitor traffic in each destination queue (i.e. group) at the 2nd network. Based on Figure 3, group 1 has two different IP blocks where traffic is monitored individually and the destination is AS500. Based on Figure 3, group 2 has two other different IP blocks where traffic is monitored and destination is AS400. See Paragraph 48

30. Regarding **claim 52**, Peles discloses that the router with congestion control has the ability to do load balancing and optimization of link utilization and therefore meets the applicant definition of mobile agent. The congestion controller (i.e. mobile agent) resides in the border router as shown in border router 100 in Figure 2. See Paragraphs 43 and 44.

31. Regarding **claim 53**, Peles discloses that each link associated with a border router is monitored and consequently traffic is redirected to another link associated with another border router where link utilization is a major input to the load balancing. When traffic on one link is completely dropped and the same traffic is re-routed to another link for load balancing purpose, the net effect will be the same as moving the mobile agent responsibility from one router to another. See Paragraph 44.

32. Regarding **claim 56 and 57**, Peles discloses an invention that provides a method of dynamically controlling traffic distribution across links between one or more border routers of an autonomous system and peer border routers of other autonomous systems. See Paragraph 16. Peles further discloses that the load-balancing algorithm regroups the blocks of IP addresses and associates each group with an appropriate link as the optimal incoming traffic link to provide the optimal load balance. See Paragraph 44. This means when a link carrying traffic from the second network to the remote network through the first network experiences heavy or light traffic load the congestion control will take corrective load balancing steps. The steps can involve assigning new traffic to a link or completely re-routing traffic away from the link.

33. **Claim 59** is rejected under 35 U.S.C. 102(e) as being anticipated by Xiong et al. (U. S. 6, 671, 256), hereinafter referred to as Xiong.

Xiong discloses an electronic edge router in Figure 3 and an optical router in Figure 5. Both types of routers have similar modules. The Fiber and Channel database, block 310 in Figure 3, stores information regarding the available bandwidth capacity of all paths in a network. See Column 4, Lines 23-33. The routing processor, block 305, receives a request for a path to route traffic through the network and using the request information returns a sequence of paths in the network to handle the traffic. See Column 4, Lines 1-6 and Column 7, Lines 15-21. The DCP management module, block 320 in figure 3, aggregates the traffic to existing paths that have enough bandwidth to carry the traffic in close coordination with the routing and signaling processors. See Column 4, Lines 60-66. The routing processor and the signaling

processor share and collect the information from other routers and perform signaling. See Column 4, Lines 1-6 and Lines 48-51. The scheduler in close coordination with the signaling processor computes and selects paths and assigns wavelengths. See Column 4, Line 66-67 and Column 5, Lines 1-13.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

34. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Golden (U. S. 6, 563, 793) in view of Spinney (U.S. 5, 414, 704).

35. Regarding **claim 7**, Golden teaches all aspects of the claimed invention as set forth in the rejection of claims 1, 5, and 6 but fails to teach that the lookup table comprises a hash table and a search tree.

Spinney teaches that a lookup table can be constructed for fast read operation for routers using a hash function. The lookup includes one memory reference to a hash table in memory, followed by at most three references to the translation database which contains a breadth-first binary tree in which hashed 48-bit address are stored. See Column 3, Lines 3-16, Column 4, Lines 27-37, and Column 9, Lines 13-22.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Golden's system to incorporate a method of creating a lookup table that comprises a hash table and a search tree, the motivation being to

perform extremely high speed lookups for routers on high speed links in data communications networks.

36. **Claims 8**, **9, 11, and 12**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Golden (U. S. 6, 563, 793) in view of Xiong et al (U.S. 6, 671, 256), hereinafter referred to as Xiong.

37. Regarding **claim 8,** Golden teaches all aspects of the claimed invention as set forth in the rejection of claims 1 but fails to teach that the available bandwidth capacity of paths is stored in each router and exchanged between routers.

Xiong discloses an optical burst-switched network with data channel reservation capability. Xiong discloses the edge routers in Figure 2 that are able to route IP traffic over a core optical burst-switched network store available bandwidth capacity in the router in the FIB and RIB. The FIB and RIB constitute the Fiber and Channel database. The routing processors (block 305 in Figure 4) of these edge routers exchange the available bandwidth capacity of paths in the network and consequently update the RIB and the FIB. See Column 4, Lines 1-11 and Lines 23-33.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Golden's system to incorporate a method of synchronizing the information stored in the routers across the immediate network, the motivation being knowledge of the latest network topology will allow the router to pick the right path in less time and forward packets quickly to their destinations.

38. Regarding **claim 9,** Golden teaches all aspects of the claimed invention as set forth in the rejection of claims 1 and 8 but fails to teach the available bandwidth capacity of paths in the network are exchanged by LIB agents in each router.

Xiong discloses that the routing processor (block 505 in Figure 5) of the routers transmit to and receive network information (i.e. available bandwidth capacity of paths) from neighboring routers. The routing processor is in effect a LIB agent for each router. See Column 5, Lines 34-40.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Golden's system to incorporate a method of synchronizing the information stored in the routers across the immediate network, the motivation being knowledge of the latest network topology will allow the router to pick the right path in less time and forward packets quickly to their destinations.

39. Regarding **claim 11,** Golden teaches all aspects of the claimed invention as set forth in the rejection of claims 1 but fails to teach that the assigned path may consist of label switched path (LSP).

Xiong discloses the optical burst-swiched network of Figure 2 can have a label switched path as an assigned path. In Figure 6, Xiong shows an example of a label information base at an optical core router. See Column 2, Lines 59-61; Column 3, Lines 43-45; Column 4, Lines 18-20; and Column 5, Lines 50-55.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Golden's system to incorporate a method of using a label-swapping technique that involves Layer two switching like the MPLS, the

motivation being to increase the packet forwarding speed. Layer two switching can significantly increase the forwarding speed when compared to Layer three forwarding.

40. Regarding **claim 12,** Golden teaches all aspects of the claimed invention as set forth in the rejection of claim 1 but fails to expressly disclose that the border or edge routers keep a list of neighboring routers that are close in distance even though it teaches that the routers have a path/device discovery mechanism.

Xiang discloses that the routing process has knowledge of the neighboring network elements, of which routers are one, and transmits to and receives network information from these neighboring network elements. See Column 4, Lines 1-11 and Column 5, Lines 34-40.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Golden's system in such a way as to extend Golden's method of path/device discovery to develop a list of neighboring nework elements including routers, the motivation being knowledge of the immediate neighbor network topology will allow the router to pick the right path in less time and forward packets quickly to their destinations.

41. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Golden (U. S. 6, 563, 793) in view of Abe et al (U.S. 6, 512, 745), hereinafter referred to as Abe.

Golden teaches all aspects of the claimed invention as set forth in the rejection of claims 1 and 13 but fails to teach that the network sends available bandwidth capacity of paths in the network to the router.

Abe discloses that the network management equipment distributes available bandwidth capacity of paths in the network to the nodes (i.e. routers). See Column 5, Lines 61-67 and Column 6, Lines 1-6.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Golden's system in such a way as to centralize the routing system using a network management tool, the motivation being able to determine the network state accurately including the utilization of the capacity of each link so that it helps reduce the number of control packets for connection setup and resource reservation and will increase the efficiency of connectionless data flow in a large data network.

42. **Claims 18–20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Golden (U. S. 6, 563, 793) in view of Peles et al (U.S. Pub. No.2002/0163884), hereinafter referred to as Peles.

43. Regarding **claim 18**, Golden teaches all aspects of the claimed invention as set forth in the rejection of claims 1 and 17 but fails to teach the second router is close to the destination node in distance.

Peles discloses that peer border routers located on the boundaries of networks exchange information pertaining to networks reachable by each individual router. Therefore the first router will have enough information to know and pick a second router close to the destination node. Peles discloses that this can be implemented using BGP protocol. See Paragraphs 9 and 10.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Golden's system in such a way as to allow border routers send reachability information to each other, the motivation being able to provide an efficient packet forwarding arrangement for routing packets in an inter-network and aides in controlling traffic on links between the networks.

44. Regarding **claim 19**, Golden teaches all aspects of the claimed invention as set forth in the rejection of claims 1 and 17 but fails to teach that the first router can request second router candidates from the destination node.

Peles discloses that peer border routers located on the boundaries of networks exchange information pertaining to networks reachable by each individual router. If the destination node happens to be a border router, then based on Peles disclosure the first router will request second router candidates from the destination router node. See Paragraph 9.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Golden's system in such a way as to allow border routers send reachability information to each other, the motivation being able to provide an efficient packet forwarding arrangement for routing packets in an inter-network and aides in controlling traffic on links between the networks.

45. Regarding **claim 20,** the modified invention of Golden and Peles as taught above discloses that the private network can be a fiber optic network provided the right choices are made in selecting the network elements, see Golden Column 16, Lines 25-29. Any

request to any router in a pure fiber optic private network will have to be sent in a lightpath.

46. **Claim 27** is rejected under 35 U.S.C. 103(a) as being unpatentable over Abe (U. S. 6, 512, 745) in view of Rekhter (U.S. 5, 917, 820), hereinafter referred to as Rekhter.

Abe teaches all aspects of the claimed invention as set forth in the rejection of claim 24 but fails to teach the leaking of bandwidth information to the edge node routers occurs via Exterior Gateway protocol (EGP).

Rekhter discloses that for inter-domain (i.e. inter-network) routers, like the edge node routers (EA, EB, EC, ED) where the bandwidth leaking occurs as described in Abe's teaching, need an inter-domain routing protocol to communicate with each other. An example of an inter-domain routing protocol is Exterior Gateway Protocol (EGP). See Column 7, Lines 33-40.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Abe's system in such a way as to terminate Exterior Gateway Protocol at the edge node routers, the motivation being able to provide an efficient packet forwarding arrangement for routing packets in an inter-network.

47. **Claim 35 and 42** are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe (U. S. 6, 512, 745) in view of Fujita (U.S. Pub. No. 2001/0032272 A1).

Abe teaches all aspects of the claimed invention as set forth in the rejection of claim 24 but fails to teach that the second network can be an IP network.

Fujita discloses in Figure 1 a communication network where sub-network 2 is connected to IP Network 2 through border routers 44 and 45 and in turn sub-network 6

is connected to IP Network 2 using border routers 61 and 62. Fujita teaches how QOS based IP traffic is routed from sub-network 2 to sub-network 6. See Paragraph 38.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Abe's system in such a way as to replace the ATM core network with an IP network, the motivation being able to provide an efficient packet forwarding arrangement for routing packets in an inter-network where the prevailing core network is IP network.

48. **Claims 44-47** are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe (U. S. 6, 512, 745) in view of Fredette et al (U.S. 6,697,361), hereinafter referred to as Fredette.

49. Regarding **claim 44,** Abe discloses that the network management equipment distributes available bandwidth capacity of paths in the network to the nodes (i.e. routers). See Column 5, Lines 61-67 and Column 6, Lines 1-6. The network will leak the available bandwidth capacity of paths to edge node router, EA, in core network 100. EA can be considered as a first router in core network 100. Abe discloses border router, RA, of access network #A, sends a request to the first router (i.e. EA) to setup a signaled path through the core network to access network #C which is the destination. The first router (i.e. EA) after examining available paths, assigns a signaled path, R2, from EA to EC access network #C. See Column 8, Lines 16-25. The first router (i.e. EA) assigned the signal path to the destination node using the intermediate nodes N1 and N3. If R6 was the assigned signal path then N2 will be the only intermediate node. See Figure 3.

Abe, however, fails to disclose a method of aggregating the signaled path to an existing path from the intermediate node to the destination.

Fredette discloses that multiple data streams sharing the same data path of edge routers and ATM network nodes can be aggregated using the same label. See Column 5, Lines 25-36.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Abe's system in such a way as to enable the edge node routers to perform path aggregation, the motivation being to decrease the number of labels used. As the number of sources and destinations in a network increases, as well as the potential of routes, the number of labels required becomes extremely burdensome.

50. Regarding **claim 45,** the modified invention of Abe and Fredette as taught above disclosed the signaled path from the first router to the destination node assigned by the first router (i.e. EA) is an existing path, PVR-R2, and starts at the first router and goes through the Network. See Abe Figure 3, item 2 of the table with PVR-ID of R2. R2 comprises of an assigned signal path from the intermediate node router N1 to the destination node EC through the core network, see Abe Column 5, Lines 1-5 and Column 8, Lines 5-10.

51. Regarding **claim 46,** the modified invention of Abe and Fredette as taught above disclosed the signaled path from the first router to the destination node assigned by the first router (i.e. EA) is an existing path, PVR-R2, and starts at the first router and goes through the Network. See Abe Figure 3, item 2 of the table with PVR-ID of R2. R2

comprises of an assigned signal path from the first router (i.e. EA) to the second router N1 (i.e. intermediate node router), and an existing path from the second router (i.e. N1) to the destination node EC through the core network, see Abe Column 5, Lines 1-5 and Column 8, Lines 5-10.

52. Regarding **claim 47,** the modified invention of Abe and Fredette as taught above disclosed the second router (i.e. N1) is close to the first router (i.e. EA). Abe teaches a Permanent Virtual Route (PVR) in Figure 3 with respect to the connection in Figures 1 and 2 between network #A to network #C over the core network 100 using a route (i.e. R6) where the second router (i.e. N1) is close to the first router (i.e. EA) and the destination node (EC or RC), see Abe Column 8, Lines 16-25. The first router (i.e. EA) can choose a second router that is close by when using link-state routing. In all types of link-state routing, initially all the routers establish adjacencies with each other and share information regarding their connections using Link State Advertisements.

53. **Claim 58** is rejected under 35 U.S.C. 103(a) as being unpatentable over Peles et al (U.S. Pub. No.2002/0163884), hereinafter referred to as Peles, in view of Fujita (U.S. Pub. No. 2001/0032272 A1).

Peles teaches all aspects of the claimed invention as set forth in the rejection of claim 48 but fails to teach routers in the first network exchange the available bandwidth capacity of the first network amongst themselves as well as with the border router of the second network.

Fujita discloses an invention in Figure 1, where the first network is network 5 and the second network is network 4. Network 4 has border routers 44 and 45. Fuji

discloses that routers in OSPF network such as networks 4 and 5 exchange routing updates using link-state advertisement packets. In the same manner, the area borders routers exchange routing updates using BGP protocol. See Paragraphs 7, 21, and 26. Figure 3c shows the routing update presented to border router 44 by its peers and clearly includes available bandwidth capacity of all paths in the remote network 6.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Peles' system in such a way as to use the features of OSPF and BGP protocols to allow area border routers to have the most accurate network topology table for neighboring networks, the motivation being able to limit the path finding calculation on unnecessary links during load balancing.

54. **Claim 60 and 61** are rejected under 35 U.S.C. 103(a) as being unpatentable over Xiong et al. (U. S. 6, 671, 256) in view of Peles et al (U.S. Pub. No.2002/0163884), hereinafter referred to as Peles.

55. Regarding **claim 60**, Xiong teaches all aspects of the claimed invention as set forth in the rejection of claim 59 but fails to teach a router having a traffic monitoring module where the traffic monitoring module monitors a traffic load initiated from a subnet.

Peles discloses a traffic-monitoring module (i.e. congestion control) that can be incorporated in a router. See paragraph 40. Peles further discloses that congestion controller in router 100 in Figure 2 is able to monitor traffic load initiated from subnet AS 500.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Xiong's system in such a way as to add a traffic monitoring module, the motivation being to dynamically monitor and control traffic on links between two networks.

56. Regarding **claim 61**, Xiong teaches all aspects of the claimed invention as set forth in the rejection of claims 59 and 60 but fails to teach a router can have a mobile agent selection module in order to manage the traffic through the sequence of paths based on the traffic monitored.

Peles discloses that each link associated with a border router is monitored and consequently traffic is redirected to another link associated with another border router where link utilization is a major input to the load balancing. When traffic on one link is completely dropped and the same traffic is re-routed to another link for load balancing purpose, the net effect will be the same as moving the mobile agent responsibility from one router to another. See Paragraph 44.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Xiong's system in such a way as to be able to monitor link utilization and re-route traffic on the links using a congestion control, the motivation being to dynamically monitor and control traffic on links between two networks to obtain optimal load balancing.

Conclusion

57. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to show the state of the art with respect to inter-network and intra-network routing

US Patent (6,823,395) to Adolfson

US Patent (6,711,152) to Kalmanek, Jr. et al

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Habte Mered whose telephone number is 571 272 6046. The examiner can normally be reached on Monday to Friday 9:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on 571 272 3088. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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HM

Ricky

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